

**PERNY'S SILK-MOTH** (*Attacus Pernyi*).—Perfect insects of this species were on view throughout the month. Fertile eggs were obtained, which commenced to hatch on the 30th instant, and are doing well. Food-plant, oak.

**TUSSEH SILK-MOTH** (*Attacus mylitta*).—This species commenced to emerge on 28th instant, a beautiful male being bred; on the following day a male and female emerged. Eggs were obtained, which are probably fertile.

**GREAT ATLAS MOTH** (*Attacus Atlas*).—Throughout the latter half of the month specimens of this species have emerged, and many fine ones have been preserved. Eggs will probably be obtained later; there are many more still to come out.

**INDIAN MOON-MOTH** (*Actias selene*).—This first specimen of this species emerged on the last day of the month.

**AMERICAN MOON-MOTH** (*Actias luna*).—During the early part of the month specimens of this species emerged. Eggs have been obtained, but it is doubtful if they are fertilised.

**PROMETHEAN SILK-MOTH** (*Telea Promethea*).—The cocoons of this species have as yet only produced a large ichneumon fly (*Ophion*). Many visitors have evinced great interest on seeing these large parasites produced from externally perfectly-formed Lepidopterous cocoons and internally stout well-made oval cocoons of the Hymenoptera.

**JAPANESE OAK SILK-MOTH** (*Antheraea Yama-mai*).—The larvæ of this species produced from eggs have done fairly well; many are now nearly full fed and about to spin. Food-plant, oak.

Besides these fine silk-moths, which are in many cases likely to be of economical value, Mr. Watkins has succeeded in breeding during the past month examples of many of the finer European butterflies, such as the swallow-tail, orange-tip, black-veined white, and *Apatura ilia*, not to mention numerous Heterocera, Hymenoptera, and Neuroptera. During the present month also many additions have been made to the series.

A guide-book to the Insectarium is in preparation, not, as we are assured, with any idea of forcing visitors to buy it, as every object exhibited is fully and perfectly labelled, but rather for the purpose of making the Insectarium better known, and getting further contributions to it from foreign parts.

#### DR. BESSELS' ACCOUNT OF THE "POLARIS" EXPEDITION<sup>1</sup>

**D.** EMIL BESSELS, as most of our readers will remember, was the chief of the scientific department on board the ill-fated *Polaris*, which was sent on her memorable North Pole Expedition by the United States Government in 1871. He finished the text of the present work in the summer of 1874, shortly after the return of the expedition, but postponed the publication until after the appearance of the official account of the voyage, which was edited by Rear-Admiral Davis. He had the misfortune to lose the greater part of his journal and many other papers in his luggage during a railway journey in Scotland.

The remarkable story of the *Polaris* Expedition is well known. Including Captain Hall, the commander of the expedition, the entire number of persons on board the *Polaris* was thirty-three. Of these eight were Esquimaux, consisting of two married couples and their four children, three little girls often, eight, and three years of age, and a boy of six. Another boy, who was named Polaris, was born during the voyage in Polaris Bay, on board the vessel. Two of those on board, besides Dr. Bessels, were scientific men, namely, Messrs. R. D. W. Bryan, astronomer, and Friedrich Meyer, meteorologist.

<sup>1</sup> "Die amerikanische Nordpol Expedition," von Emil Bessels. Leipzig: W. Engelmann, 1879.

The highest point reached by the *Polaris* was lat. 82° 26' N. at the northern mouth of Robeson Channel. After being beset by ice and having been nipped sufficiently to render her extremely leaky, the ship was moored for the winter about forty miles south of this point in Thank God Harbour, on the east side of Robeson Channel, to the north of Petermann Fjörd. Several sledge expeditions were made from this point, but without reaching a higher latitude than that attained by the ship. Capt. Hall died on board on November 8. In the following summer attempts were made in vain to push further northward, and it was found the ship leaked so badly that it was necessary to return homewards. The ship became beset in the ice on August 16, and remained thus, drifting southwards with the field, suffering constantly from ice-pressure, until October 15, when it was in such jeopardy from the ice-movements that most of the provisions and stores of all kinds and all the boats were passed out on to the ice. The ice parted suddenly, and drifted away from the ship with nineteen persons upon it, including all the Esquimaux, whilst fourteen, and amongst them Dr. Bessels, remained on board. This took place at night. The castaways remained upon the ice 196 days, suffering terrible hardships, and having drifted to the coast of Labrador, were there picked up by a sealing-ship, even the children having survived. They saw the *Polaris* in shore at the commencement of their long journey, and wondered their comrades did not come to their assistance, not knowing that the ship was practically a wreck, and abandoned. Those left on the ship at

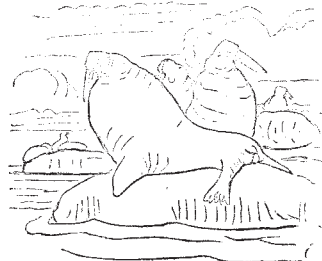


FIG. 1.—Walruses at rest on the ice.

the parting of the ice, keeping the leaking ship with difficulty afloat, and unable to see anything of those on the ice, got ashore near Cairn Point in the middle of Smith's Sound, and having wintered there in company with some Esquimaux families, built some boats from the wreck, and travelling south partly in these, partly on the drift-ice, were picked up in the west of Melville Bay by a whaler, the *Ravenscraft*, on June 23. Thus all engaged in the expedition, excepting Capt. Hall, got back in safety.

All this is related by Dr. Bessels in a most graphic and highly interesting style, and his book is filled besides with interesting accounts of the habits of animals met with, the condition of the vegetation of the region explored, the mode of life of the Esquimaux, meteorological and other scientific observations. We shall touch on a few of these. At Fiskernæs, on the south-west Greenland coast, the author turned over some of the kitchen middens of the Esquimaux, such as are now formed in front of each hut. In a very short time remains of all the eatable vertebrates of the Greenland fauna are to be found in them, and in many cases it would not be difficult to fix the season at which the deposits were made, for in places are found scarcely anything but bird-remains, in other places those of fish, in others those of mussels. Many good dogs' skulls and a number of marrow bones of seals broken for their marrow were found in the middens. At the same place one of the sailors of the *Polaris* nearly lost his life by attempting to perform the feat which most of the Esquimaux accomplish with such ease, of turning their kajak upside down without leaving

their seat, and then righting themselves from under water with a blow of their paddle.

Some interesting remarks are made on the calls used by various Esquimaux tribes whilst dog-driving. All the

Esquimaux of that part of Greenland, which is under missionary influence, drive their dogs with the call *i! i! i!* and accompany the sound with a smack of the whip to the right or left when they wish to turn, whilst the dogs are

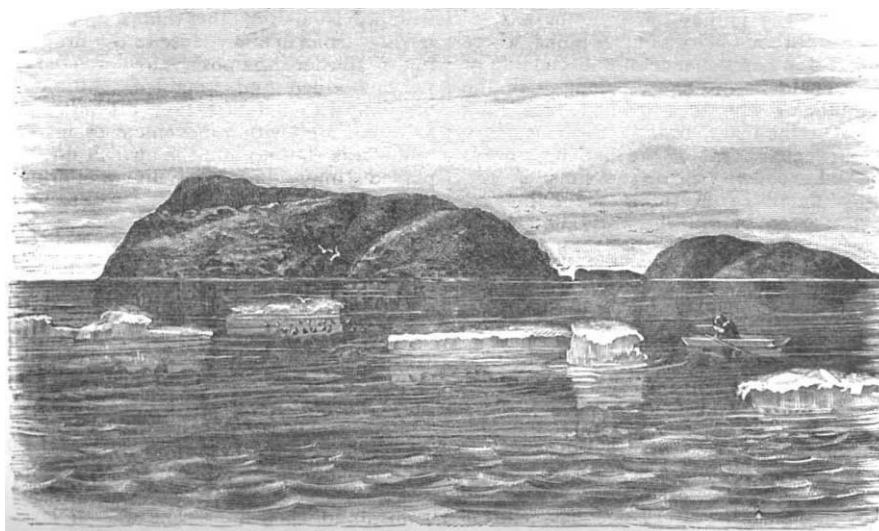


FIG. 2.—Littleton Island.

stopped by a short whistle. The Esquimaux tribe on the side of Smith Sound use similarly the sound *hă!* *hă!* *hă!* and as a halting signal a lengthened *ōh!* Those

inhabiting the neighbourhood of Ponds Bay, as one of the Esquimaux on board the ship informed the author, use the call *wōă-ăh-hă-hă-hă!* to turn their dogs to the



FIG. 3.—Group of Ita Esquimaux huts with *Polaris* House and the wreck in the distance.

right, and *ăh-wōă-wă-hă!* to send them to the left; *ōh!* for halt. The calls used in Cumberland, a district of Baffin's Land, are somewhat similar sounds to the last;

formerly they were more like them still, but have changed. The natives on the shores of the Hudson's Straits use only the call *au! au! au!* and those of King



William's Land only *kgu! kgu! kgu!* Amongst these two latter tribes the whip is almost unknown; the dogs are led or turned from side to side by means of a piece of wood which the driver throws out on the side from which they are to turn. The Esquimaux of Alaska appear to have no stereotyped driving cries, but merely to use various oaths promiscuously as they come to mouth.

During one of the author's sledge expeditions, where the going was very bad in consequence of the yielding of the snow, the dogs could hardly be got along with the whip, so two Esquimaux who accompanied him took turns to run in front of the team, trailing a fish tied to a string. The dogs struggled to get at the herring, always out of their reach, and excellent progress was made.

Some interesting details concerning the habits of Esquimaux dogs are given by the author. The instant halt is called by the driver the dogs throw themselves to the ground with their snouts between their forepaws; they rise again to stretch, and then lie down again at once. Two Newfoundland dogs which belonged to the *Polaris* pack gradually assumed similar habits; but before lying down they always turned round and round in their resting-place, like all dogs except the Esquimaux breed, for the author never saw an Esquimaux dog do this. Mr. Darwin, as will be remembered, has explained this habit of turning round before lying down, invariably to be observed in other domestic dogs, as a survival of the instinct of the wild ancestor, which leads him to form a bed in the grass by this means. Every one has heard of the extraordinary voracity of the Esquimaux dogs; they will even sometimes snap off a piece of their master's flesh if carelessly exposed. One day, on board the *Polaris*, the porcelain door-handle of one of the cabins fell off with the usual square rod of iron attached to it. Five or six of the dogs made a rush at it, there was a momentary struggle, the dogs were hastily driven away, but the door knob was already swallowed. The dog that ate it was none the worse, nor the handle either in the end. An Esquimaux told the author that the following were the points to be noticed in selecting a good dog:—a broad breast, short ears, strong legs, large feet, low loins, and a moderately long tail. The tail must not bend too near its root, as this shows the loins to be weak.

The descriptions of the Esquimaux and their habits throughout the work are worth reading. The most interesting are those relating to the Ita Esquimaux, inhabiting the north shore of the Foulke Fjörd, with whom the author and his companions spent their second winter. They consisted of nine men, three women, and eight children, who crowded at night the small house built by the shipwrecked party, and as there was no room for them usually to lie down, slept sitting with their backs against the walls. The floor measured only twenty-two feet by six, yet had to accommodate thirty-four persons, and once thirty-eight. It was no use erecting a tent for the visitors under the lee of the house; they preferred the close quarters inside.

The author's principal friend was Awatok, the priest of the tribe. He usually accompanied him when it was his watch, on his hourly rounds to the meteorological instruments. "We walked generally arm-in-arm, and when there was no snow drifting sang the tune of the spirited student's song, 'Was kommt dort von der Höh,' using *bum—bum—bum* instead of the words. After a little while he learnt to hum the tune fairly well." After some time the natives built snow huts near the *Polaris* house, and settled for the winter. The first to do this was one named Stokirssuk, but called "Jimmy" by the *Polaris* people. He was born near Cape Searle, about 650 miles south of Port Foulke. Whilst he was a youth he and his father left their home and wandered north and reached Cape Isabella, where they fell in with an Esquimaux tribe, of whose existence they had been ignorant. Here Jimmy married a wife with tattooed face, and five

summers before the arrival of the *Polaris* had moved up thence to Ita, in a company consisting of a woman's boat and four kajaks. He had forgotten how many persons composed the expedition. They found Capt. Hayes' life-boat on Littelton Island and destroyed it, and discovering the observatory at Port Foulke which Hayes had left filled with provisions and other things, lighted a fire there to cook birds. Unfortunately close to the fireplace was a canister full of powder; the observatory was blown up, and several persons killed and wounded. Jimmy related, his face beaming with laughter, how his father-in-law was killed, and indicated with a movement of his hand how the old fellow was shot up into the air. A dog which had accompanied Jimmy during all his wanderings was still fresh and strong.

Another noticeable native of the band was Majuk Kane's former companion; he was always hungry and a beggar. He named his youngest son, scarcely six weeks old, *Dakta-kè*, which meant no more or less than Doctor Kane. This he did in order to flatter the *Polaris* people and ingratiate himself. Sometimes he brought a walrus liver or a few tongues, and got bread or tinned meat for them, at others a skin to get a harpoon for it. But in some moment, when unwatched, he would eat the tongues himself and carry off the liver again; but he did it so innocently that it was impossible to be angry with him. At one time during the winter the Esquimaux were nearly starving, yet one of them—Awatok—would not beg for his family, and when a present was at last sent to him of bread and bacon, had already killed five of his dogs to keep his wife and children alive. His strength of character and power of self-denial were remarkable.

The Ita people have no boats, and do not possess the bow and arrow, although words for these things still exist in their language. These facts show a very remarkable degradation, especially in a hunting people. Jimmy alone had a bow and three arrows. They had often been mended, and being very seldom used, were in a wretched condition, and Jimmy himself was a very bad shot.

One burial took place during the stay of the author. The corpse was wrapped in skins placed on a sledge, and buried in the snow with the face turned westwards. After the body was covered the sledge was turned over on top of it, and the hunting implements of the deceased laid by it. The men plugged their right nostril with hay, and the women their left, and these plugs were worn for several days, and only taken out when the wearers entered a hut. When it is possible a heap of stones is usually raised over the corpse. The nineteenth chapter is devoted to an ethnological sketch, in which the culture and characteristics of the various Esquimaux tribes are compared.

A good many musk-oxen were met with, and the author gives a valuable account of the habits of this animal. None of those killed by the *Polaris* people had a very marked musk smell. The author is uncertain whether this peculiarity is to be attributed to the very high latitude in which they were obtained, or to their having been killed out of the breeding season. No difficulty was found in distinguishing the tracks of these animals from those of reindeer, although some former observers have not found this easy. In all the herds there are from ten to twenty cows to one bull. Their voice is somewhat like the snorting of the walrus, and never resembles in the least the cry of the goat or the sheep. When danger approaches they never give signal with their voice, but only by stamping or striking their neighbour with their horns. They have dire combats with bears sometimes, and often come off victors.

A report, as will be remembered, was spread by newspapers at the time of the return of the expedition, that the *Polaris* had discovered walnut driftwood in the high north, and gave the author as an authority for the statement. Nothing however but coniferous wood was in reality

found. One of the most important matters contained in the book is the author's account of a Bathybius-like albuminous substance which he discovered in the mud composing the sea-bottom, at a depth of ninety or ninety-five fathoms north of Smith Sound. The specimens of mud were brought up in a water-bottle apparatus, about a large spoonful being obtained each time of sounding. This mud was very sticky, and showed itself under the microscope to consist of a yellowish gray mass with numerous opaque lime particles embedded in it. If some of the mud was left to rest in a hollowed out glass slip for some time the albuminous masses exhibited unmistakable amœboid movements, and took into their substance particles of larmine. The substance is named *Protobathybius*.

We cannot follow the author further. His book is well worth reading, and only escaped notice here sooner through accident. It is well illustrated throughout. He takes exception on the ground of priority to the name Palæocrystic Sea, which Sir George Nares conferred upon the expanse which the Americans had previously named Lincoln Sea. He states that, owing to the neglect of his work by an assistant, numerous serious errors occur in the official volume of scientific results of the *Polaris* expedition already published, especially in the meteorological department. These are corrected in the appendix to the present volume, which contains also much other scientific matter. He finds fault throughout his book with the conduct of the ice-master of the *Polaris*, S. O. Buddington, and considers that the ship might have reached higher latitudes if, on two occasions which he believes were favourable, a push had been made northward. He accuses Buddington of not even going up into the crow's-nest as often as he should have done to examine the state of the ice. Some official correspondence which passed on board the ship on these questions of the management of the expedition is given in the book. The manner in which the meteorological observations were kept up after the shipwreck, and the devotion with which Dr. Bessels attempted, though in vain, to sledge far north after the wreck from *Polaris* house are highly creditable.

The book is dedicated to the Arctic explorer, Capt. A. H. Markham, R.N., who with great kindness, and at very considerable inconvenience, shared his cabin on board the whaler *Arctic* with Dr. Bessels on the voyage to Dundee, the *Ravenscraig* having fallen in with the *Arctic* on the whaling-grounds.

H. N. MOSELEY

### THE COMET

THE comet which, so far as we are yet informed, was first astronomically observed in the southern hemisphere on May 29, is now well under observation in these latitudes, and as its position will become more and more favourable, it will be a mere question as to how long our telescopes will show it, what data may be obtained for an accurate determination of its orbit. The elements appear to have some resemblance to those of the great comet of 1807, to which reference was made in Dr. Gould's early telegram from the observatory at Cordoba, but the identity of the comets appears highly improbable after Bessel's classical memoir containing a rigorous investigation of the orbit of the comet of 1807, which he followed until the perturbations of the known planets had ceased to be sensible. We may briefly recall the circumstances attending the appearance of that body and one or two main results of Bessel's investigation. According to Piazzi it was first detected by an Augustine monk at Castro Giovanni in Sicily on September 9, but the first regular observation was made on the 22nd of the same month by Thulis at Marseilles. From this time the comet's positions were determined at every opportunity by Bessel, Olbers, Oriani, and others until the end of February, 1808, and on the 18th of the following month

Wisniewsky, favoured by a very acute vision and the clear skies of St. Petersburg, observed the comet again, and succeeded in fixing its position until the 27th. In consequence of a notification from Olbers, that with powerful telescopes there might be a possibility of observing the comet again as the earth overtook it to some extent in October and November of the same year, Bessel, then working with Schroeter at Lilienthal, closely examined its track with reflectors of 15 and 20 feet focal length, and on November 9 did succeed in finding an extremely faint nebulosity near the computed place of the comet, which he could not find subsequently, but as the position differed 12' from that assigned by an orbit which he considered very exact, he came to the conclusion that the object he observed was not the comet of 1807, but another one which happened to be in the vicinity, and which was not seen elsewhere. The discussion of the six months' observations of the comet appears in the masterly treatise to which we have referred, viz., "Untersuchungen über die scheinbare und wahre Bahn des im Jahre 1807 erschienen grossen Kometen," published at Königsberg in 1810. The method of determining the perturbations of a comet due to planetary attraction, which is detailed in this memoir, was long practised by the German astronomers in similar cases.

Bessel inferred from his researches that at the perihelion passage of the comet on September 22 it was moving in an ellipse, with a period of revolution of 1714 years, which was reduced to 1685 years at the date of Wisniewsky's last observation, and continuing his computation of the perturbations to March, 1815, when the effect of planetary attraction had become very small, he found the period further reduced to 1543 years.

The general aspect of the comet now visible as viewed in an excellent *Cometen-sucher*, reminds us of the appearance of the comet of June, 1845, discovered by Colla, which was observed under very similar circumstances, and it may be mentioned that Encke stated at the time that the comet of 1845 reminded him strongly of the great comet of 1819, which passed across the sun's disk on June 26.

The present comet appears to have been at its least distance from the earth about June 21, and should soon present a material diminution of brightness. In perigee its distance would be about 0.3.

[Since the above was in type we have received observations from Dr. Elkin, of the Royal Observatory, Cape of Good Hope: After a week of overcast sky the comet was found there on May 31. Mr. L. A. Eddie, F.R.A.S., of Graham's Town, saw it on May 27, and others claim to have seen it two days earlier. On June 4 the tail was 6° long, coma 20 minutes, and nucleus 20 seconds in diameter; the comet was as bright as a *Columbæ*.]

The following opinions of American astronomers have appeared in the *Daily News*. That paper, with wonderful journalistic enterprise, has not hesitated to telegraph nearly a column of matter from America on this subject:—

"Prof. Stone, of the Cincinnati Observatory, thinks it is not the comet of 1812, because of its not moving in a southerly direction, but that it may possibly be that of 1807. Professors Eastman and Skinner, at the Naval Observatory, succeeded in getting some fair observations of the comet on Friday night, although the night was not altogether favourable. Prof. Skinner describes the comet as having an extremely bright nucleus, which presented a very ruddy appearance. The observers did not know whether this appearance was normal, or was due to the prevailing atmospheric conditions. Prof. Skinner estimates the tail, which is fan-shaped, at about eight degrees in length. It was also ascertained that in twenty-two minutes the comet travelled three seconds in arc, and in an hour nine seconds, giving it a daily rate of travel northward of about three degrees thirty-six seconds. Computing its motion from its position when discovered,